small oblong continental, spaidal, churches. Of cruciform Churches, Croyland and Buildwas Abbeys, are on the simple base of the vesica; others are shewn partly so, but where that form has to be applied to plans, partly internal and partly external, including walls and buttresses in the breadth, and excluding them in the length, or *vice versâ*, Mr. Kerrich's theory cannot be admitted further than as a small integral part of a more general and comprehensive system; its use is shewn for proportioning doors and windows, and, in some cases, sections of buildings and spires. Where the nave and chancel vary in breadth—as Barfreston, Bricksworth, Stourbridge, &c. (shewn by Kerrich)—the base of the triangles equals the breadth of the chancel, its length being determined by the vesica or double equivalent triangle; and in each of these cases, the breadth of the nave, by forming a similar vesica upon the remaining length. The Anglo-Norman church at Adel, in Yorkshire, has the breadth of the nave determined by the base of the equilateral triangles formed upon the extreme length internally. With the breadth as a radius produce the vesica and extend the arcs to that breadth, and describe a segment upon the intersection of the arcs on the breadth; or by extending each arc to a quadrant, and striking a segment on these points, the length of the nave is determined: upon the same central point strike a circle tangent to the last segment, and the breadth of the chancel is defined; with this breadth as a radius, the simple vesica will be found the true proportion of the chancel. This proves that even the incomplete system may be extended beyond the limit of the diagrams in the "Archæologia," shewn by the late Mr. Kerrich.

The equilateral triangle alone has been tried, and though by dividing into certain parts forms may be composed, no great variety can be produced, as, like the former, it is but a minor portion of the great system in which most others will be found combined.

Another system was shewn to me about the year 1830, by Mr. John Browne, of York (the antiquary), whose valuable history of York Cathedral (now nearly completed) will be of more practical service to the profession than any work I have met with on pointed architecture and its decorations. Mr. Browne's discovery was *on the circle*; it was submitted (in manuscript), to the Society of Antiquaries, who did not approve of its title, "The Trinitarian System of Pointed or Christian Architecture." By placing a square or cross upon the centre of the circle, dividing it into four equal parts, centres are obtained for vesica of a different proportion to those formed by the double triangles, which in many cases of foliated trucery are equally efficient. Upon two points of this square, and upon the circumference of the circle, the second form is produced by the radial segment; strike the same radial segment opposite to the first, and the vesica is produced. (Fig 1.) With one point of the compasses on this second figure or first vesica, and the other upon the apex, where it intersects the circumference of the circle, the third figure or second vesica is given: by striking these radial lines upon each of the four points on the circumference, centres are produced in abundance for quatrefoils, crosses, and other figures, applying more especially to tracery.

In many works the vesica piscis has been explained, and amongst them in one on Stonehenge,* which contains an essay on Druidism. In this the traditional dimensions are given of the first Christian church of this country, founded in the Isle of Avalon, or Glastonbury, and its proportion is the first vesica of Mr. Browne's diagram. This also gives the proportions of the naves, and their aisles, of the cathedrals of Durham, Ely, Peterborough, Canterbury, and Salisbury, but no others, and cannot, therefore, be considered an universal system. Mr. Billings has given some very useful information in his "Geometric System of Tracery;" and in his "History and Illustrations of the Temple Church" has formed some very reasonable conjectures relative to the original design; and Mr. Clarkson's essay on its "Symbolic Evidences," with the plan relative thereto in the latter work, merits a careful investigation. Mr. Wallen, in his "History of the Round Church at Maplestead," and his more recent works and lectures on the "Geometric Principles of Tracery," has contributed essentially towards the development of the system.

* By Malachi Mouldy, F.B.A.

Others have written on this subject; but for want of time to examine their works I must pass them over, to notice a recent work of great merit—"Mr. Griffith's Natural System of Architecture, applied more particularly to the Temples of Greece"—beginning with the primary forms in geometry, and applying those forms within the circle to both plans and elevations, giving the true and just proportions, whether upon the triangle, the square, or the pentagon, prove that the author has succeeded in developing a true and perfect principle.

The system upon which every divisible geometrical figure is founded, is the *Circle*. The semi-diameter, or radius, divides the circumference into six equal parts; by drawing straight lines upon the alternate points two equilateral triangles are formed, intersecting each other. (Fig. 2.) Upon the intersections of the triangles continue the lines to the circumference of the circle, and six centres are given; upon which, with the first radius, striking a second series of segments will produce a third set of twelve centres; upon the second centres two intersecting triangles, with their bases, perpendicularly to the first, complete the first part of the diagram. Upon the twenty-four points of the intersecting inner arcs a circle inscribed will determine the lesser, or inner triangles, upon the centres of the first, and the diagram is thus perfected. This will suffice for the simple forms, but for the more complicated, an additional number of centre lines may be drawn upon the remaining intersections: thus we have twenty-four divisions of 15 degrees each, dividing the circle into 360 degrees. The first division of the circle, by its diameter, or 180 degrees; the trigon, or triangle, of 120 degrees; the tretragon, square, or rectangle, 90 degrees; upon this figure another division is produced, which, I have imagined, would explain the theory of the Egyptian Pyramids. On referring to Mr. Agnew's letter on the Pyramids of Egypt, he states, that "on the diagonal, the vertical line from the base to the point would be the radius." If so, this confirms my theory of their construction. Take the square, with its centre in the centre of the circle; its diagonals are the four divisions of the circle; upon the face of this square (the elevation based upon the diameter of the circle) two lines, meeting upon the circumference, will be found to be the vertical centres of four inclined equilateral triangles. Hence four equilateral triangles, meeting at the apex, produce the radius of the circle on their diagonal, and the rectangle and the half square. Vitruvius tells us, that Plato discovered this method of doubling the square. But may this not have been known to the Egyptian *magi* long before? A line drawn from the base to the opposite face of the Pyramid, where intersected by the great trigon, indicates the pentagonal division of the circumference of the circle; the Pyramid thus, is the mystic symbol, which combines every principle of geometry, and contains all the regular figures or polygons founded upon the first, or primary divisions—the hexagon of 60 degrees is the figure which is preeminently distinguished: it is produced by the radius of the circle. In all ages it has been symbolized, and may be appropriately termed a "natural system." That insect emblem of industry, the bee, constructs its cell in this form, economising space in a manner unattainable by any other figure. This was doubtless held by those of ancient times (who, in their monastic cells, had leisure for contemplation) to be a lesson to man through so simple an insect. Space, emblematic of time, pointing out the value of industry and the exercise of the intellect, wherewith he is blessed during the short period of his sojourn upon the surface of this planet. Were I to treat of symbolism, I should shew that this diagram indicates the six lesser revolving round the greater central planet, the six days for labour, and numerous other emblems; half a side of the trigon divides the circumference into seven, but it is indivisible by numbers.

The heptagon has been set apart from the even, or divisible numbers, and always held as symbolic or mystic. The octagon of 45 degrees is the division of the square, the nonagon of 40 degrees, the third of the trigon; and the decagon of 36 degrees, dividing the pentagon, ends the numbers used for the primary purposes of constructive proportion. This, according to Vitruvius, was Plato's perfect number, but the Anti-platonists, with their six, or the radial division of the circle, could, by the working of their centres (without the necessity of dividing with the compasses), produce the ten, shewing that they were the more perfect as their system combined all others. Mr. Browne, of York, says, "the circle symbolically represents the Divine Power, the Universe, Eternity, without beginning, without end, infinite and perfect;" but it should be observed, the equilateral triangle was used in a similar manner, and for the same purpose.

I will proceed to the use of the system practically, in the formation of our mediæval churches, and its universal application to the adjustment of the proportions.

Observing the intersecting triangles in many buildings, I conceived that this would prove to be the system, or diagram, whereupon geometric proportion was founded (sometimes exhibited entire, and at others in part only), and this explains why I came to such conclusion. In 1842, on taking down the old Church of Leven, in Holderness, upon a fragment of one of the nave pillars, I found a cross of the 13th century; on measuring it, I found every centre upon the diagram, and that every line was struck. This applies to an infinity of crosses *fleury*, the method of striking them being concealed by the artistical disposition of their foliated embellishments. In the tracing of many windows and decorations of churches, the system is clearly exhibited, which a few examples will suffice to indicate. The Anglo-Norman interlaced arches, those particularly in three stages in Wenlock Priory; the trefoil and complex triangular windows of York, Beverley, Salisbury, and Lincoln Cathedrals; the circular window in the south transept of York; the peculiar window in the west front of Canterbury; and the circular window of the south transept of Lincoln Cathedrals; the circular window of Winchester Palace, in Southwark. This peculiar window shews the system slightly varied, and almost undisguised, and it appears in a simple form, but more veiled, in the east window of Hawkhurst Church, in Kent, or on the borders of Sussex. In both large and small churches it is introduced, not only in windows, but in various ornaments, both external and internal, particularly in piscina, sedilia, &c. In the continental churches it is equally conspicuous, and may be detected in every ancient structure that has escaped the beautifying ordeal of modern over-zealous church-wardens.

In its application to plans, Walkington Church, near Beverley, affords a simple illustration, using the entire diagram, which compound forms require: the nave is upon the intersection of the triangles produced by the radial divisions, the chancel upon the vesica formed by one of those divisions, and the transept upon the central intersection of the triangles; the lengths and breadths are thus determined by the radial divisions and their centres. All the plain oblong churches answering to Mr. Kerrich's system are proportioned by the second radial figure, produced by the divisions of the circle; but instead of working them out upon this portion of the diagram, they should be placed upon its centre, one end being upon the base of the great triangle, which will facilitate the operation of giving proportion to a plan. I have taken these two plans to explain the difference of working compound figures, as in our cathedrals, and simple ones, as Bainwell, Adel, Barfreston, &c.; the churches of Maplestead and the Temple are worked in a different manner to the others, as the system is shewn entire in the hall or chapter-house; this western portion, having, I imagine, been erected for the assemblage of the templars. Upon Mr. Billing's plan of the Temple Church—the circular nave to the west, is the scale upon which the diagram is formed: a circle struck upon the intersections of the triangles passes through the centre of the outer range of columns, and on the inner circle, tangent to the triangles, is the centre of the inner range; the breadth of the choir to the east, is the diameter of the great circle; the trisection of the inner circle gives the centre of the clustered columns, of the choir, north and south of the centre line, the centres of the outer range of columns, and

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